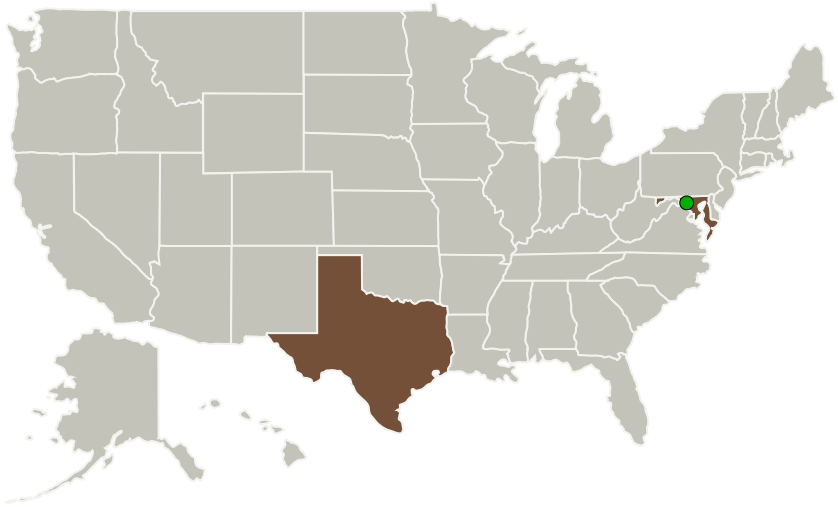
Miniature Laser Magnetometer (MLM), Phase I

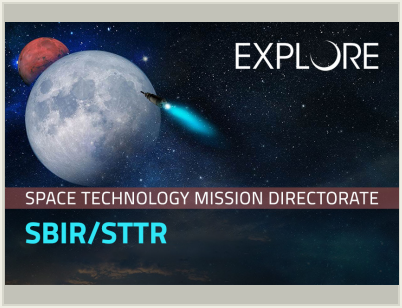
Completed Technology Project (2010 - 2010)

Project Introduction

This 2009 NASA SBIR Phase 1 proposal for an innovative Miniature Laser Magnetometer (MLM) is a response to subtopic S1.06 Particles and Field Sensors and Instrument Enabling Technologies. The MLM instrument will incorporate a number of technical innovations to achieve high-sensitivity and high-stability performance while significantly reducing the size of the laser-pumped helium magnetometer for use on very small satellites and UAVs. The MLM design approach will trade sensitivity for miniaturization of critical components while still meeting the performance requirements for geomagnetic and space science experiments. Reduction in instrument mass, volume and power will be accomplished through innovations including miniaturized components, laser spectroscopy techniques for resonance detection, compact integrated optical designs and miniaturized electronics packaging. The MLM will have a dynamic range up to 75,000 nT and a 860 Hz sample rate. The scalar sensitivity will be 1 pT/rtHz with an accuracy of 0.1 nT. The vector sensitivity will be 1 pT/rtHz with an accuracy of 0.5 nT. Trade studies will select the innovations for inclusion in the MLM conceptual design that will demonstrate the feasibility of fabricating and demonstrating a brass-board in Phase 2. The TRL is expected to be 4 at the end of the Phase 1 contract.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Polatomic, Inc.	Lead Organization	Industry	Richardson, Texas
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Texas

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140000)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Polatomic, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

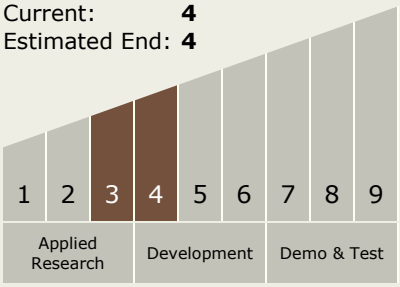
Carlos Torrez

Principal Investigator:

Robert Slocum

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.1 Field and Particle Detectors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System